REMARKS

Restriction Requirement

In the Office Action, the Examiner acknowledged Applicants' election of claims 22-30 with traverse in response to the restriction requirement of the prior Office Action and made the restriction requirement final. The Examiner indicated that this reply must include cancellation of non-elected claims or other appropriate action. By the present amendment, claims 1-21, being subject to the restriction requirement, have been cancelled from this application without prejudice to filing one or more divisional patent applications. New claim 31 has been added which contains the limitation of cancelled claim 6. Upon entry of this amendment, the claims pending in this application will be claims 22-31.

Specification

The Examiner objected to the disclosure because of the following informalities:

(a) On page 4 at line 27, recitation of "monochlorotrifluoroethylene" may be improper according to traditional wording of "**CTFE**" used in the art. A change to its common name as "**chlorotrifluoroethylene**" is needed since ethylene can have only four bonding groups.

(b) On page 14 at line 19, recitation of "perfluoro(ethylvinyl ether)" may needed to change to "**perfluoro(ethyl vinyl ether)**" with a space between ethyl and vinyl to be consistent with the same wording used on page 4 at line 28 as well as page 2 at line 6.

Applicants have made the appropriate corrections for (a) and (b) by this amendment.

Claim Objections

The Examiner objected to claim 26 because of the following informality:

In **claim 26** at line 1, a claim dependency to "**claim 25**" is needed since "said heating element" is present in claim 25 only.

Applicants have appropriately corrected Claim 26 to be dependent upon claim 25.

Claim Rejections - 35 USC § 102

The Examiner rejected claims 22-30 under 35 U.S.C. 102(b) as being anticipated by Krause et al. (EP 0,002,894 A2).

Concerning claim 22, the Examiner takes the position that Krause et al. have disclosed a process for joining together two sheets of non-melt-processible organic polymer such as tetrafluoroethylene homopolymer (PTFE). The Examiner says that the Krause et al. method comprises four steps as follows: (A) obtaining a melt-processible fluoropolymer selected from polychlorotrifluoroethylene, polyvinylidene fluoride, a copolymer of ethylene and chlorotrifluoroethylene, and fluorinated ethylene/propylene copolymer (FEP) (page 5, line 9-16), (B) contacting and then stitching a strip of melt-processible copolymer from (A) onto the surface of the non-melt-processible polymer sheet(s) such as polytetrafluoroethylene (page 6, line 21-27), (C) heating to fuse the melt-processible copolymer from (A) with a temperature lower than melting point of the non-melt-processible polymer (page 6, line 2-12), and (D) cooling to room temperature (page 10, line 30).

The Examiner notes that FEP copolymer is melt-processible, as disclosed by Krause et al. (page 13, line 8-11) and such a fluoropolymer is both "structurally and inherently" reading on the limitation of "a copolymer of tetrafluoroethylene and at least about 15% by weight of a highly fluorinated monomer, said copolymer having a melt viscosity of no greater than about 1000 Pa•S at 372°C and an application temperature of no greater than about 250°C". The Examiner also notes that "contacting and then stitching" of step (B) is fundamentally equivalent to "positioning" in second step of Claim 22 with the language of "the process comprising" being used on line 3. It is further noted that the use of PTFE homopolymer sheet(s) as substrate is reading on "each section of the two sheet material has at least one fluoropolymer surface".

Regarding Claims 23-25 and 28, the Examiner states that step (B) by contacting and then stitching a strip of the melt-processible copolymer from (A) onto the surface of the polytetrafluoroethylene sheet(s) read on the limitations of Claims 23-25 and 28 (page 6, line 28-31; page 7, line 15-26). The Examiner notes that the stitching is functionally equivalent to using a tape. It is noted that PTFE sheet is used as a carrier sheet to carry FEP.

Regarding Claims 26 and 27, the Examiner states that the fusing step (C) may be accomplished by the application of both heat and pressure, wherein the convenient pressure is about 10 lb/sq in with a maximum temperature up to 300°C (page 6, line 2-4 and 15-17; page 10, line 25-26).

Regarding Claims 29 and 30, the Examiner takes the position that the statement on page 5 at lines 17-26 is reading on the limitations of Claims 29 and 30. Particularly, the PTFE sheets may be brought together so that one sheet slightly overlaps the other on lines 21-22.

The Examiner also rejected Claims 22-30 under 35 U.S.C. 102(b) as being anticipated by Adiletta (US 4,865,903).

Regarding Claim 22, the Examiner takes the position that Adiletta discloses in Figure 1 (referring to brief description on column 3 at lines 53-59) a process for joining together two film-sheets of non-melt-processible organic polymer such as tetrafluoroethylene homopolymer (PTFE) (as component #13), said method comprising four steps as following: (A) obtaining a melt-processible fluoropolymer (as component #14) selected from fluorinated ethylene/propylene copolymer (FEP) and the like (column 2, line 18-34; column 5, line 50-58), (B) applying a coating of melt-processible or thermoplastic copolymer from (A) onto of both surfaces the non-melt-processible polymer film-sheet(s) such as polytetrafluoroethylene; or onto both surfaces of the fabric substrate (as component #11), (C) positioning the composite structure as Figure 1, (D) heating to fuse the melt-processible copolymer from (A) with a temperature lower than melting point of the non-melt-processible polymer, and (E) cooling to room temperature (column 7, line 30 - column 8, line 62; column 9, line 14-20; also referred to working examples 1-2).

The Examiner notes that FEP copolymer is melt-processible or thermoplastic as disclosed by Adiletta and such a fluoropolymer is both "structurally and inherently" reading on the limitation on "a copolymer of tetrafluoroethylene and at least about 15% by weight of a highly fluorinated monomer, said copolymer having a melt viscosity of no greater than about 1000 Pa•S at 372°C and an application temperature of no greater than about 250°C" (column 5, line 50-58). The Examiner further notes that the use of PTFE homopolymer sheet(s) or fabric substrate as substrate to carry FEP is reading on "each section of the two sheet material has at least one fluoropolymer surface".

Regarding Claims 23-25 and 28, the Examiner takes the position that the use of above-mentioned step (B) and step (C) together read on the limitations of Claims 23-25 and 28, noting that fabric or PTFE film sheet is used as a carrier sheet to carry FEP.

Regarding Claims 26 and 27, the Examiner states that the fusing step (D) may be accomplished by the application of both heat and pressure, wherein the convenient pressure is about 1.0-25.0 psi with a maximum temperature up to 550 °F (column 7, line 65 - column 8, line 11; column 4, line 5-8).

Regarding Claims 29 and 30, the Examiner says that the structure disclosed in Figure 2 is reading on the limitations of Claims 29 and 30, particularly, that the PTFE sheets may be brought together so that one sheet slightly overlaps the other.

Response to Claim Rejections - 35 USC § 102

The invention as now claimed in this application provides a process for sealing a seam between two sections of sheet material wherein each section has at least one fluoropolymer surface. The process includes forming a band of heat sealable composition of a copolymer of tetrafluoroethylene and at least about 15% by weight of a highly fluorinated monomer, wherein the copolymer has a melt viscosity of no greater than about 1000 Pa•S at 372°C and an application temperature of no greater than about 250°C. The band is positioned over the seam between the two sections of sheet material such that the heat sealable composition contacts one fluoropolymer surface of each section. The band is heated to a temperature no greater than 250°C sufficient to seal the seam and the heat sealable composition is allowed to cool.

Employing a tetrafluoroethylene copolymer having a melt viscosity of no greater than about 1000 Pa•S at 372°C and an application temperature of no greater than about 250°C enables the process to be employed with a wide variety of architectural fabrics including PTFE coated glass fabric, which is not normally prone to damage by heating, as well as fabrics containing other resins such polyester or polyvinyl chloride which could be damaged by high temperature. The specified melt viscosity of the tetrafluoroethylene copolymer facilitates sealing and, in the embodiment of the process where a heated element is used, only low pressures are required, preferably no greater than 5 psi.

With respect to the rejection based on Krause et al., Applicants submit that Krause et al. do not disclose the process of the invention as set forth in Applicant's claim 22. The Krause et al. patent relates to joining sheet materials and the specific use disclosed is the joining of porous sheets useful in the construction of diaphragms for use in a chloralkali electrolytic cell. The Krause et al process is intended for joining sheets of organic polymer sheets which are not melt-processible by contacting with a strip of melt processible polymer in the region of juxtaposed edges of the sheets, stitching the strip to sheets, and heating the strip in order to fuse the strip and/or the thread to seal the holes created by the stitching step.

The melt-processible polymer strip in Krause et al. can be a fluoropolymer. However, unlike the present invention, Krause et al. do not disclose a tetrafluoroethylene copolymer as called for by Applicants' claim 22. The tetrafluoroethylene copolymer of claim 22 contains at least 15% by weight of a highly

fluorinated comonomer and has a melt viscosity of no greater than about 1000 Pa•S at 372°C and an application temperature of no greater than about 250°C.

Examples of polymers disclosed as being suitable by Krause et al. are polychlorotrifluoroethylene, polyvinylidene fluoride, fluorinated ethylene/propylene copolymer and a copolymer of ethylene and chlorotrifluoroethylene. Polychlorotrifluoroethylene, polyvinylidene fluoride, and the chlorotrifluoroethylene/ethylene copolymer are not tetrafluoroethylene copolymers and thus they do not fall within claim 22. With respect to fluorinated ethylene/propylene copolymer (FEP), it is a tetrafluoroethylene copolymer but it does not meet either the melting point or viscosity limitation of the claim. Commercially available FEP has a melting point of at least about 260°C and thus could not have an application temperature of no greater than about 250°C as called for in claim 22. Also, the viscosity of commercially-available FEP is much higher than 1000 Pa•S at 372°C. For example, a typical FEP resin sold by E.I. du Pont is de Nemours and Company is FEP 100. FEP 100 has melting point of 264°C a melt flow rate (MFR) of 6.6. An MFR of 6.6 is equivalent to a viscosity of 8060 Pa•s. [Viscosity (Pa•s) = 53170/MFR (g/10 min.) See US 4,380,618.] Commercially available FEP with lower molecular weight also does not meet the limitations of claim 22. For example, FEP 6100 resin sold by E.I. du Pont is de Nemours and Company for high-speed extrusion use has melting point of 264°C an MFR of 30. An MFR of 30 is equivalent to a viscosity of 1770 Pa•s, still far outside the claimed range. Product Information sheets for these products are attached. Moreover, the use of FEP in Krause et al. is illustrated in Example 1 where a strip of FEP is used (see page 10, line 11). On page 10, lines 24-29, the Krause et al discloses heating the FEP strip to 300°C to fuse the strip and seal the holes create by stitching. Thus, the melt-processible strip employed by Krause et al. clearly does not meet the limitations for the band called for in claim 22. Moreover, Krause et al. do not meet the process limitation of claim 22 of heating the band to a temperature of no greater than 250°C to seal the seam. Accordingly, Krause et al. do not disclose a process as set forth in claim 22 employing a band of a tetrafluoroethylene copolymer having a melt viscosity of no greater than about 1000 Pa•S at 372°C and an application temperature of no greater than about 250°C.

Claims 23-30 are directly or indirectly dependent upon claim 22 and are directed to preferred forms of the invention. Because all of the features of claim 22 are not disclosed by Krause et al., claims 23-30 are necessarily also novel over Krause et al. Applicants respectfully point out that claim 27, dependent upon claim 26 which calls for applying pressure to a heating element, calls for applying a pressure no greater than 5 psi. Krause et al. discloses a higher pressure of

approximately 10 psi at page 6, lines 15-17. Applicants also respectfully point out that new claim 31, directed to perfluoro(ethyl vinyl ether) monomer, is also clearly novel. No polymers containing perfluoro(ethyl vinyl ether) monomers are disclosed in Krause et al.

Accordingly, Applicants submit that the rejection of claims 22-30 under 35 U.S.C. 102(b) as being anticipated by Krause et al. should be withdrawn.

With respect to the rejection based on Adiletta, Applicants submit that Adiletta also does not disclose the process as set forth in Applicants' claim 22. Adiletta discloses composite structures for use in protective clothing including a PTFE barrier film with a coating of a thermoplastic fluoropolymer adhered to a fabric substrate. Seams are formed by folding the laminate, sewing and heating sufficiently to permit the thermoplastic fluoropolymer coating to flow into and seal the stitching holes. Adiletta also discloses in Column 9, lines 5-13, a layer of "heat sealed PTFE/FEP tape" to cover otherwise exposed stitching. While the PTFE/FEP tape is not further explained, one skilled in the art would probably take this to mean a laminate of PTFE film and FEP. PTFE is of course not melt processible and the tape would be employed so the PTFE faces outwardly.

As discussed above with respect to Krause et al., commercially-available FEP has a melting point of at least about 260°C and has a viscosity much higher than limitation called for in Applicant's claim 22. The temperatures disclosed in Adiletta for thermal-melt-bonding are consistent with commercially-available FEP. At column 8, lines 4-6, temperatures of about 500 to about 700°F are disclosed which converts to about 260 to about 371°C. At column 4, lines 6-9, Adiletta discloses that in general the temperature will be higher than about 550°F (288°C). Clearly, there is no disclosure in Adiletta of a tetrafluoroethylene copolymer having an application temperature no greater than about 250°C or of heating a band of such copolymer to a temperature of no greater than 250°C to seal the seam.

Accordingly, Adiletta does not disclose a process as set forth in claim 22 employing a band of a tetrafluoroethylene copolymer having a melt viscosity of no greater than about 1000 Pa•s at 372°C and an application temperature of no greater than about 250°C.

Claims 23-30 are directly or indirectly dependent upon claim 22 and are directed to preferred forms of the invention. Because all of the features of claim 22 are not disclosed by Adiletta, claims 23-30 are necessarily also novel over Adiletta. New claim 31 is also clearly novel over Adiletta because no polymers containing perfluoro(ethyl vinyl ether) monomers are disclosed in Krause et al.

Applicants submit that the rejection of claims 22-30 under 35 U.S.C. 102(b) as being anticipated by Adiletta should be withdrawn.

A petition for a three month extension of time is also enclosed.

In view of the foregoing, allowance of the above-referenced application is respectfully requested.

Respectfully submitted,

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